Santa Fe, 33.9; Pueblo, 36.8; Cheyenne, 32.2; Idaho Falls, 26.0; Salt Lake City, 34.0; Los Angeles, 51.6; Fresno, 50.6; Point Reyes Light, 51.2; Sacramento, 50.2; Carson City, 40.4; Winnemucca, 35.6; Idaho Falls, 26.0; Baker City, 30.3; Roseburg, 44.4; Eureka, 50.0; Port Angeles, 39.0. It was not the lowest on record at any regular station of the Weather Bureau.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: 87, Los Angeles (9th); 81, Yuma (21st); 80, San Antonio (21st), Jupiter (23d); 79, Key West (23d), Corpus Christi (21st), Phœnix (10th), and San Luis Obispo (10th). Lowest maxima: 34, Sault Ste. Marie (31st); 36, Alpena (12th), Marquette (31st); 38, St. Vincent (21st); 39, Northfield, (3d). The highest minima were: 55, Key West (5th); 42, Point Reyes Light (24th); 40, Jupiter (1st), San Francisco (6th); 39, San Diego 12th). The lowest minima were: —39, St. Vincent (4th); 31, Havre (3d); —27, Moorhead (4th); —25, Duluth (4th), Sault Ste. Marie (5th), Miles City (3d).

The years of highest maximum and lowest minimum temperatures are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record at: Neah Bay, 65; Baker City, 51; Idaho Falls, 39; Pierre, 60; Huron, 51; Sioux City, 63; Salt Lake City, 54; Carson City, 60; Los Angeles, 87; Yuma, 81. The minimum temperatures were the lowest on record at: Narrangansett Pier, —11; Block Island, —4.

The greatest daily range of temperature and the extreme monthly ranges are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values of the greatest daily ranges were: Helena, 55; Rapid City, 54; Pueblo, 53; Havre, 52. The smallest values were: Key West, 12; Point Reyes Light, 15; Port Huron, Grand Haven, and Astoria, 17; Buffalo, Detroit, Hatteras, Galveston, and Fort Canby, 18; San Francisco, 19; Spokane, Nantucket, Philadelphia, Marquette, and Cleveland, 20. Among the extreme monthly ranges the largest values were: Havre, 84; St. Vincent, Rapid City, and North Platte, 77; Miles City, 76; Sioux City, 73; Huron, 72; Pierre, 71. The smallest values were: Point Reyes Light, 19; San Francisco, 23; Key West, 24; Fort Canby, 26; San Diego, 23; Astoria, 29.

Accumulated monthly departure from normal temperatures.—For the period January 1 to 31, the average temperature was above the normal throughout the whole country, except in New England, middle Atlantic, Florida Peninsula, and east Gulf. In regions where the temperature was deficient, the average deficit for the period was as follows: New England, 2.0; middle Atlantic, 1.6; south Atlantic, 2.5; Florida Peninsula, 3.5; east Gulf, 1.6.

In regions where the temperature was in excess, the average excess for the period was as follows: west Gulf, 2.5; Ohio Valley and Tennessee, 2.3; lower Lake, 0.5; upper Lake, 4.2; North Dakota, 4.7; upper Mississippi, 6.4; Missouri Valley, .4; northern Slope, 7; middle Slope, 9.3; southern Slope (Abilene), 4.9; southern Plateau, 4.6; middle Plateau, 8.1; northern Plateau, 9.4; north Pacific, 3.1; middle Pacific, 3.4; southern Pacific, 4.1.

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32°, and the limit of frost by the isotherm of minimum 40°.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Measurements of evaporation within the thermometer shelters are difficult to make so as to be comparable at temperatures above and below freezing, and may be replaced by computations based on the wet-bulb temperatures. The absolute amount of evaporation from natural surfaces not protected from wind, rain, sunshine, and radiation, are being made at a few experimental stations and will be discussed in special contributions.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. A complete expression for the relation between atmospheric conditions and nervous sensations has not yet been obtained.

PRECIPITATION.

[In inches.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest on the immediate coasts of northern California, Oregon, and Washington. It was least in southern California, Nevada, and New Mexico. The largest values were: East Clallam, 26.9; Neahbay, 25.8; Tatoosh Island, 22.6; Pysht, 21.4.

The *current departures* from the normal precipitation are given in Table I, which shows that there was a deficit in most regions. The principal excesses were in the Pacific Coast States. Large excesses were: Neahbay, 10.5; Tatoosh Island, 9.3; Sacramento, 5.9; Carson City, 3.3; Palestine, 3.3; Shreveport and San Francisco, 3.2. The large deficits were: Knoxville, 4.3; Chattanooga, 4.2; Nashville, 4.0.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: Florida Peninsula, 107; west Gulf, 113; North Dakota, 192; southern Slope, 153; southern Plateau, 144; middle Plateau, 164; north Pacific, 136; middle Pacific, 143; southern Pacific, 119.

Below the normal: New England, 41; middle Atlantic, 45; south Atlantic, 75; east Gulf, 67; Ohio Valley and Tennessee, 42; lower Lake, 71; upper Lake, 76; upper Mississippi, 55; Missouri Valley, 57; northern Slope, 85; middle Slope, 48; northern Plateau, 91.

The years of greatest and least precipitation for January are given in Table I of the REVIEW for January, 1890. The precipitation for the current month was the greatest on record at: Williston, 2.02; Tatoosh Island, 22.57; Neahbay, 25.85; Carson City, 5.26; Sacramento, 9.76; El Paso, 1.63. It was the least on record at: Eastport, 0.84; Northfield, 0.87; Albany, 0.98; Block Island, 2.02; Narragansett Pier, 1.59; Harrisburg, 1.00; Port Huron, 0.69; Green Bay, 0.98; Louisville, 0.82; Lexington, 1.25; Knoxville, 1.49; Parkersburg, 1.42.

The *total accumulated monthly departures* from normal precipitation since the beginning of the current year, furnishes

the following excesses: Florida Peninsula, 0.20; west Gulf, 0.50; North Dakota, 0.60; southern Slope (Abilene), 0.50; southern Plateau, 0.20; middle Plateau, 1.00; north Pacific, 3.50; middle Pacific, 2.50; southern Pacific, 0.40. The deficits are as follows: New England, 2.40; middle Atlantic, 1.90; south Atlantic, 1.10; east Gulf, 1.70; Ohio Valley and Tennessee, 2.60; lower Lake, 0.80; upper Lake, 0.50; upper Mississippi, 0.80; Missouri Valley, 0.50; northern Slope, 0.10; middle Slope, 0.50; northern Plateau, 0.20.

Details as to *excessive precipitation* are given in Tables XII and XIII.

The hourly distribution of precipitation is not now tabulated.

The *total monthly snowfall* at each station is given in Table II. Its geographical distribution is shown on Chart No. VI. The limit of freezing temperatures and possible snow is shown on the same chart by the isotherm of minimum 32°. The southern limit of frost in exposed localities is approximately shown by the isotherm of minimum 40°, within the thermometer shelter.

The depth of snow on the ground at the close of the month is shown on Chart VII.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 21, 22, 23. Arizona, 28, 29. Arkansas, 13. California, 17, 19, 20, 28, 29, 30. Florida, 22. Georgia, 21, 23. Louisiana, 21, 22, 25. Nevada, 21, 28. New Mexico, 29. North Carolina, 13. South Carolina, 23, 24. Tennessee, 23. Texas, 25, 30. Utah, 21.

SLEET.

The following are the dates on which sleet fell in the respective States:

Arkansas, 15, 23, 25. Colorado, 16, 22. Connecticut, 12, 24. Delaware, 31. Georgia, 7, 16, 23. Idaho, 1, 8, 15, 16, 17, 20 to 23, 29. Illinois, 10, 11, 16, 19, 21 to 24. Indiana, 19, 22, 23, 24. Iowa, 15, 17, 18, 19, 22, 23, 30, 31. Kansas, 14, 15, 16, 18, 30, 31. Kentucky, 10, 11, 16, 27. Louisiana, 6, 21. Maine, 3, 24, 25. Maryland, 9, 10, 19, 22, 23, 24. Massachusetts, 12, 22 to 25. Michigan, 9, 18, 22 to 25, 31. Minnesota, 6, 9, 10, 11, 15, 17, 19, 21, 23, 27 to 31. Mississippi, 15, 24, 25. Missouri, 15, 19, 20, 22 to 25. Montana, 10, 21. Nebraska, 14 to 19, 21, 22, 24, 29, 30, 31. Nevada, 13, 17, 21, 23, 25, 28. New Hampshire, 24, 25. New Jersey, 3, 7, 9, 24. New Mexico, 1, 26, 27. New York, 3, 18, 19, 23 to 26, 29, 30, 31. North Carolina, 7, 15, 16. North Dakota, 9, 11, 21, 30. Ohio, 3, 9, 14, 18, 19, 22, 23, 24. Oregon, 1, 16, 17, 18, 23. Pennsylvania, 3, 19, 22 to 26, 31. South Carolina, 15, 16. South Dakota, 15, 16, 21 to 24, 28 to 31. Tennessee, 7, 13, 23, 24. Texas, 28, 29, 30. Utah, 29. Virginia, 7, 8, 23. Washington, 1, 4, 8, 13 to 18, 23, 24, 25, 27. West Virginia, 3, 4, 5, 9, 21, 22, 23. Wisconsin, 10, 18, 20, 22, 23, 24.

WIND.

The *prevailing winds* for January, 1896, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

The *diurnal variation* in the velocity of the wind is shown in Table VII, which gives the total movement for each hour of seventy-fifth meridian time, as deduced from self-registering anemometers at about 136 stations.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R. I	10	54	ne.	Fort Canby, Wash	26	72	s.
Do	24	66	e.	Do	27	55	sw.
Cheyenne, Wyo	1	56	w.	Do	31	66	se
Denver, Colo	1	66	sw.	Landen, Wyo	1	50	w.
Do	2	54	nw.	Moorhead, Minn	21	53	se.
Eastport, Me	25	50	ne.	Tatoosh Island, Wash	5	53	s.
Fort Canby, Wash	5	72	s.	Do	6	54	se.
Do	6	60	se.	Do	7	60	se.
Do	7	70	s.	Do	16	59	e.
Do	8	61	s.	Do	17	52	e.
Do	16	59	se.	Do	25	52	s.
Do	19	60	s.	Do	26	50	s.
Do	20	66	s.	Winnemucca, Nev	18	52	sw.
Do	24	54	e.	Do	21	54	sw.
Do	25	73	s.	Woods Hole, Mass	4	53	nw.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 16 regular stations of the Weather Bureau by its photographic, and at 21 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of clear sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary when the duration of cloudiness is alone desired, as is usually the case.

The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *duration* of effective sunshine whence the duration relative to that of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observers' personal estimate of percentages of area of clear